

# Client Centered Care and Upper Extremity Trauma

OTAC, Pasadena, 2024

## Objectives:

- Summarize client centered care in occupational therapy
- Describe hand and upper extremity trauma and its effects on roles, habits and routines
- Differentiate between a therapist’s view and a client's view pertaining to goals and prognosis
- Recommend an occupational therapy model(s) that can assist in guiding client centered treatment with this population
- Explain the process of client centered care with this population via a previous case study
- Identify 1-3 new questions you can personally add to your evaluation process

## Key presentation Point #1: When we say Client Centered what do we mean

Significant: Listening to the client/patient and recognizing their needs/wants

Significant: Shifting the balance of power – medical model

Significant: Provider self-reflection is key to fully understand client point of view

## Notes:


## Key Presentation Point #2: Trauma, our brains and the narrative

Significant: What happens inside of us because of trauma, and why “being seen” is important for physical healing as well as emotional/mental

Significant: Hand injuries can be heavily associated with trauma. The narrative the client uses can tell us a great deal about how they may recover. It is important for us to identify the thought process and guide the narrative away from rumination and hopelessness.



Primary Takeaway from presentation:

- Although treatment session time is not always on our side, we can be client centered through use of our dialogue and purposeful connection to effect occupational progress.
- Trauma can be a variety of internal experiences, and it takes a caring clinician to discover how impactful the trauma is on the client's everyday life and hand function
- Our hands are not separate from our bodies. The traumatic experiences we have directly and indirectly affect how we manipulate or want to manipulate our physical environments
- As providers we cannot self-reflect enough. The more we know about ourselves the better we can serve our populations by being the start of client centered care.

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# **The Kawa Model Made Easy**

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A Guide to Applying the Kawa  
Model in Occupational Therapy  
Practice (2nd edition)

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Teoh J. Y. & Iwama M. K.

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## **What is occupational therapy?**

Occupational therapy is a health profession recognized by societies as having expertise in facilitating and enabling people to solve practical problems in everyday life so that they can *engage and participate in roles, processes and activities that are important and of value to them.*

The health professional delivering this specialized service is called an occupational therapist.

## **What is the difference between occupational therapists and other health professionals?**

Conventional health professionals are concerned with pathology and other illness processes located in the human body.

Occupational therapists are concerned with the *consequences* of those pathologies and issues *on experiences and needs of daily life*, including how they affect interactions with other people and the physical environment.

## **How do occupational therapists work?**

First, they seek to *understand* what the *consequences and effects* of pathology and issues are *on life experience* occurring within their daily environments and also how those pathologies and issues affect the people around them.

Then they work with clients to restore, increase or maintain their capacity to engage and participate in daily life activities, not just pertaining to the client with the pathology or problems themselves, but also with the persons around them, their physical environment, etc.

*A functional life devoid of meaning is merely existence, not living. Robots perform tasks, people engage in life activities to create and derive meaning*

~ Charles Christiansen (2010)

We spend a lifetime learning how to do things that are essential for the survival of our selves, families, communities or for pleasure and achievement. Some people in the Western and Northern parts of the world have adopted a specialized term to describe this phenomenon and they call it 'occupation'.



People and their environments and interactions in daily life are unique and highly complex, and so the process of occupational therapy necessarily begins with and revolves around the client's story of their daily life experience.

## **What is the Kawa Model?**

Kawa is the Japanese word for 'river'. The Kawa Model uses the natural metaphor of a river to depict one's life journey. The varying and chronological experience of life is like a river, flowing from the high lands down to the ocean. Along its meandering path, the quality and character of its flow will vary from place to place, from instance to instance. Occupational therapists try to enable, assist, restore and maximize their clients' life flow.

The Kawa Model can be used as a conceptual model of practice, frame of reference, assessment tool and modality.

The Kawa Model can be used metaphorically in its original form of a river, or in its underlying form of FIVE interrelated constructs:

- i. River Flow - life flow and priorities
- ii. River Banks - environments / contexts, social and physical
- iii. Rocks – obstacles & challenges
- iv. Driftwood – influencing factors
- v. Spaces – Opportunities for enhancing flow

Like a river where its source represents the beginning of life and its mouth meeting the sea representing the end, the Kawa Model takes into consideration the past, present and future needs of the client.

The Kawa Model (2006) was created by a team of occupational therapists in Japan led by a Japanese-Canadian occupational therapy scholar to enable occupational therapists everywhere to “just ask the client how they want to live their lives so that it is more meaningful to them, and look together with them what they can do to achieve that.” (Teoh 2010)

The inclusive nature of the Kawa Model allows the occupational therapy client to be considered as a collective, meaning that it can be used on individuals, families, groups and organizations.

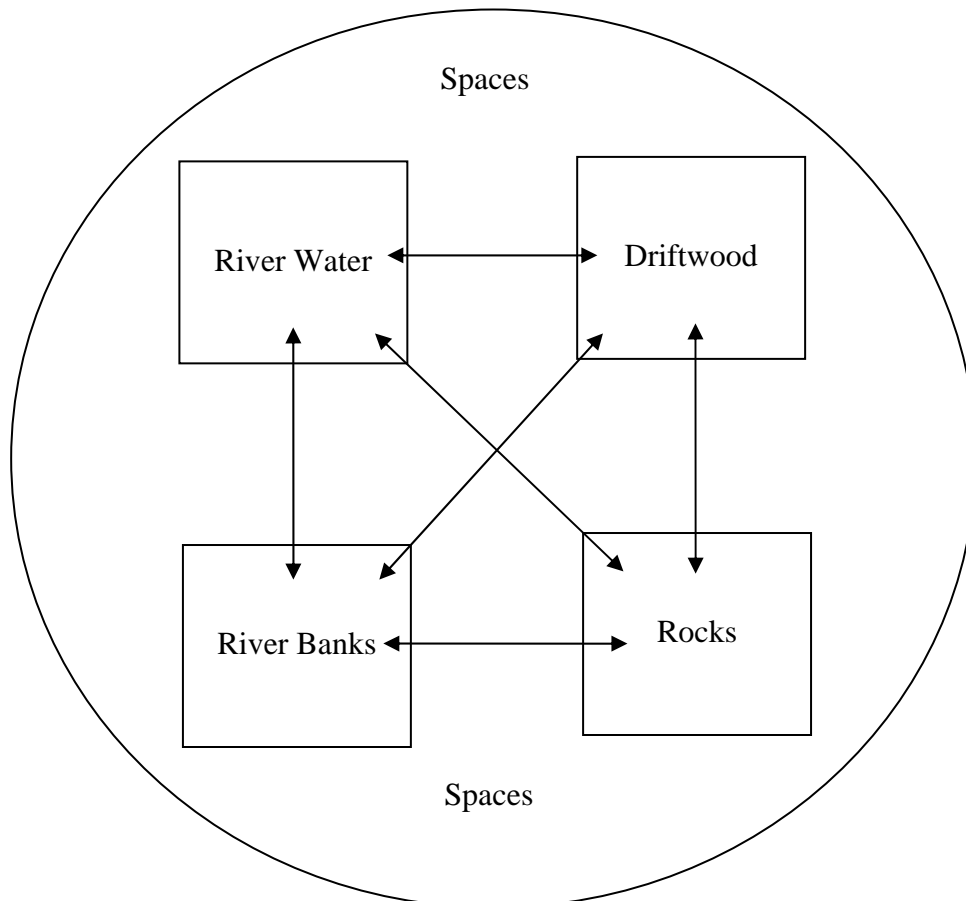
## The Kawa Model as an Assessment Tool

The underlying constructs of the Kawa Model can be utilized as a subjective assessment tool for occupational therapy diagnosis, to identify what activities / roles / processes occurring within the client's life contexts are important to them, and what issues they experience in relation to their environments.

The Kawa Model as a subjective assessment tool also allows the occupational therapist and client to determine what supports and resources they have internally and externally which can aid or undermine the occupational therapy intervention.

The Kawa interview doesn't have to follow a particular order. The interview flow resembles a river itself: You can be asking a River Bank question which leads to a River Flow question which can lead to a Rock, leading back to River Flow again, etc -Meaning that the interview can be back and forth in nature, as indicated in the diagram below.

Diagram 1.0: Underlying constructs of the Kawa Model



What matters in the Kawa interview is how the person explains the components that make up their life process, and not whether the therapist agrees with the client on whether something is Rock or Driftwood. Remember, occupational therapy is all about the client's river - about their life experience, from their viewpoint. The clients will identify their issues and problems and explain their meaning, to which occupational therapists can offer an approach that is centered on the person's day-to-day realities and that is ultimately meaningful to that person. So try to allow the client to express themselves freely. The aim of the model is not to follow a particular procedure but rather in the explanations that the client gives about their experience of day to day living.

### **The Kawa Model's Principles of Use**

#### Honouring the client and trusting emergence

- Be ready to discard all universal assumptions about the relevance and appropriateness this model, start working with your client from a clean, objective slate.
- If the model and the metaphor on which it is based fail to resonate with either the client or occupational therapist, it should be modified or placed aside in exchange for a more appropriate and relevant model.
- The client's narrative *becomes the model* on which we base the occupational therapy process. Trust that the client's narrative will emerge through a process of enabling him or her to do so.
- Be aware of your own cultural lens. Competent therapists will not only appreciate the culture embodied within the client but also the cultures at play within themselves, with the occupational therapy they have learnt and experienced and the institutional conditions that set the mandate and structure for the therapeutic process.

#### The centralized and decentralized self

- Does the client experience the self as separate from the environment or as an integrated part of a greater entity? Clients who experience the self as separate might draw themselves on a boat on the river, but clients who experience themselves as integrated parts of a whole frame will not see the need for this and regard the entire diagram of the river as the embedded in the environment and circumstance, with occupation embedded into the river as well. How clients perceive their selves will then influence their expectations of what they would like to get out of their occupational therapy.
- Clients who perceive their selves as distinct from the environment might be more appreciative of values like autonomy, independence and control. Clients who perceive their selves to be integrated into a larger whole might appreciate values like balance, co-existence and harmony more. How occupational therapists work with their clients will be largely dependent on the clients' values.

For more details, please refer to Chapter 8 (pp. 160) of the original Kawa Model textbook.

## **Guiding Questions to Using the Kawa for Subjective Assessment**

With the Kawa Model being essentially qualitative, it is impossible to have any fixed set of questions in place as an assessment tool. However, we can utilize guiding questions to examine and explore the five underlying constructs of our clients' Kawa.

When looking to delve into meanings behind experiences, the key questions to ask would be “How?” and “Why?”

Note: These questions are merely guides and suggestions. Some questions might not be suitable for your circumstances, and some questions may seem like they are asking the same thing but in different ways. The purpose of these questions is just to give you some idea of what you can ask and how you can ask them, but these are not all you should ask, and you don't have to ask all of them.

We would like to encourage occupational therapists everywhere to come up with your own questions, suitable for your situation. And we would encourage you to share those questions as well as your experiences and findings with other occupational therapists from other places by emailing it to us at [kawarivermodel@gmail.com](mailto:kawarivermodel@gmail.com) or sharing with us via our Team Kawa Facebook group <http://FB.com/groups/TeamKawa> so that we can make it available to others.

You are more than welcome to produce a translated version of this manual and to produce any related writing or research about the Kawa Model. However, we would appreciate if you let us know about your work (via email at [kawarivermodel@gmail.com](mailto:kawarivermodel@gmail.com) or our Team Kawa Facebook group at <http://FB.com/groups/TeamKawa>) so that others may benefit from your work as well.

By sharing your work on the use of the Kawa Model in your context, you are actually helping to advance and develop the Kawa Model!

## River Flow (Life Flow and Priorities)

### Suggested Guiding Questions

1. If your life was a river, what does your river look like? How would you describe the flow of your river right now?
2. Can you describe to me how you typically spend your day from the time you wake up to the time you go to bed?
3. What do you enjoy doing? Why do you enjoy it?
4. What makes you happy? How does it make you happy? Why?
5. Have you experienced any significant changes in your life recently?  
(This is more suited for client who have adapted to congenital deficits or those from the well population, i.e. caregivers. However, it can be assumed that suddenly having to care for a family member with a disability would cause a major change in one's life flow.)  
Could you tell me a little bit about them?
6. How do you typically go around doing your everyday activities?

### Notes:

- River flow questions take the past, present and future (what clients wish to do or intend to do) into consideration.
- The client's work history, medical history, life roles, processes (i.e. aging), self care and leisure activities, as well as other occupations, can all be considered part of the river flow.
- The river flow can comprise of many little streams flowing into one. The river flow of significant persons in the occupational therapy client's life (caregivers, spouse, etc) should also be considered and incorporated where relevant.

## **Rocks (Obstacles & Challenges)**

### Suggested Guiding Questions

1. Are you having any difficulties right now? What are they? Why do you think (those things) are difficult for you? How is it difficult?
2. Do you have anything in particular that you would like to do but you are unable to do because of your current situation? Why do you think you are unable to do them? How are these things typically done? How is doing them right now different from back then? What would you like to be able to do?
3. Is there anything about your life right now that you would like to change? What is it? Why? How would you like things to change? If things were better, what do you think would be different?
4. I understand what you have been through a lot lately and things can be a bit overwhelming. Is there anything in particular which you are worried or unsure about that you would like to discuss?

### Notes:

- Rocks can typically be categorized into (but are not restricted to) occupational performance difficulties, fears and concerns, inconvenient circumstances out of occupational therapy's control, and impairments or medical concerns.
- As with River Flow, the Rocks of significant persons in the occupational therapy client's life (caregivers, spouse, etc) should also be considered and incorporated where relevant.

## **River Banks (Physical and Social Environment)**

### Suggested Guiding Questions

1. Who are you currently living with right now?
2. Who do you typically spend most of your time with? How do you spend your time with them? What do you usually enjoy doing together? (As you can see, this question leads us back to the River Flow.)
3. Where do you typically spend most of your time? (This is yet another question that can lead back to the River Flow.)
4. Can you describe to me the place where you live / work? How do you find your ability to get around there? (This can lead to Driftwood or Rock!)
5. Do you live in a single storey / double storey terrace / apartment / flat / wooden house? Is your room upstairs or downstairs? Are there lifts?
6. Are your toilets sitting or squatting?

### Notes:

Social environment can represent friends and family, classmates, colleagues, lovers, pets, deceased relatives, acquaintances etc – any social supports that the client considers significant.

## **Driftwood (Personal resources that can be assets or liabilities)**

- Driftwood can be personal traits or characteristics – like what some might call “personality” traits or “attitude”, i.e. “stubborn”, “likeable”, “sense of humour”, “addiction”, “pragmatic”, etc.
- Driftwood can also be special skills, abilities and experiences. Maybe the person is good at sports, maybe they have a specialized education or trade, maybe they are good with people, sociable, good with their hands, artistic, etc.
- Driftwood can also represent beliefs, values and principles
- Driftwood can represent material and/or social capital, such as financial wealth and access to money as well as social connections to others who hold power/influence.

All these can have a positive or negative effect on the River Flow of one’s life, i.e. driftwood can pushing rocks out of the way (positive) or get stuck between rocks (negative).

Driftwood can typically be tackled by finding out client’s rocks and what makes their river flow, then asking questions which reveal their advantages and abilities in handling those situations, i.e. “Can you drive?” (Rock / Obstacle: Wanting to go back to work but seen as unfit) or “What do you think makes you a good doctor?” (River / Occupation: Doctoring.)

### **Suggested Guiding Questions**

1. Some other good questions to use generally include:
2. How do you see challenges in life?
3. How do you typically cope with stress?
4. How would you describe yourself? Why?
5. Do you have any special skills or abilities?
6. Can you tell me about your education?
7. Are there activities that you are good at or enjoy doing? (This can also be a River question.)
8. Are there any things or thoughts that get in the way of your life going better? (This can also be a Rock.)



## **Creating Spaces - Using the Kawa Model to Guide the Occupational Therapy Process**

Studying the dynamic relationship between the four constructs (river, banks, rocks and driftwood) would allow us to understand better the circumstances surrounding our clients' lives and identify opportunities for enhancing flow, resulting in a fifth construct known as "spaces".

Every space in the client's river, where water is flowing has potential to flow more powerfully. These areas or "channels" are bounded by other parts of the river, such as walls, rocks, driftwood, etc. The client alongside the occupational therapist considers all of the factors as opportunities to intervene by removing or lessening the magnitude of the river part that is impeding flow, the client's life flow can be enhanced - even maximized.

Intervention measures are used to create and / or widen spaces for water to flow. These are some of the ways spaces can be developed:

1. Rocks become smaller, i.e. the client adapts to the dysfunction over time and the dysfunction is no longer as big a hindrance to their daily life as it used to be; AND / OR remedial interventions have resulted in the dysfunction becoming less severe and client has regained more functions.
2. Adjust / widen river banks, i.e. universal design and other adaptations to the physical environment.
3. Use existing driftwood / introduce new pieces of driftwood to push away rocks, i.e. client learns new skills (i.e. how to use speech to text software) to overcome the inability to type due to loss of hand function.

After subjective assessment with the Kawa Model, the occupational therapy process can be continued with objective assessments. The results of the subjective Kawa assessment will determine the objective assessment tool choice.

E.g.: (These are just examples; choose objective assessments appropriate to your situation!)

- Difficulties in ADL can be assessed with the Modified Barthel Index.
- A physical environment with many barriers might warrant a home visit and measurements can be taken.
- Discomfort while performing daily activities due to numbness and tingling in the hands might warrant a Semmes-Weinstein Monofilament Test.

The data is then interpreted and the treatment aims determined:

- Spaces for flow can be identified and attention to developing them prioritized according to collaborative discussion between occupational therapist, client and caregivers.
- Your practice context may limit what you can realistically work on. You may be limited to working on one or two factors but increasing flow on just these areas can make a significant and positive difference in the client's life.
- Short Term Goals and Long Term Goals can be considered. Intervention is then based on the data collected from assessments, particularly the Kawa interview.
- Rocks are addressed based on Driftwood and Environments with the intention of enhancing the client's Life Flow (occupational therapy outcome).

## **6 Steps for using the Kawa Model in Clinical Practice Situations**

Refer to chapter 8 (pp. 164) on the Kawa Model textbook.

- Step 1 Who is the client? Appreciate the client in context. (Use the Kawa Model interview as described in this manual.)
- Step 2 Clarify the context – get your client to elaborate on what information you have just extracted via the interview. "Why is this rock here and why is it so big?"
- Step 3 Prioritize issues according to the clients' perspective.
- Step 4 Assess focal points of occupational therapy intervention.
- Step 5 Intervention.
- Step 6 Evaluation.

Important Note when trying to apply the Kawa Model on your clients:

Test what you've learnt in this manual on a few of your friends and family first. Use the information obtained to try to gain insight into their life rivers – is there anything you can do to facilitate flow? Are there better ways of asking questions? Would you have to phrase the questions differently in order for the people you're interviewing to understand you better / be more inclined to give you the information you need? This is where the "art" of occupational therapy comes to play. After you've tested it out on 5, 10, 20 different people, you'll get a better grasp of how to use it with an actual client. ☺ Happy testing!

### **Recommended Reading:**

Iwama M. (2003). The issue is toward culturally relevant epistemologies in occupational therapy. *American Journal of Occupational Therapy*, 57(5),582-588.

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Kawa Model official website: [www.kawamodel.com](http://www.kawamodel.com)

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Occupational Therapy Practice Framework

AOTA. (2008). Occupational Therapy Practice Framework: Domain & Process 2nd Edition. *American Journal of Occupational Therapy*, 62(6): 625-682.

Canadian Occupational Performance Measure

Law, Mary; Polatajko, Helene; Pollock, Nancy; Mccoll, Mary Ann; Carswell, A. B. (1994). Pilot Testing of the Canadian Occupational Performance Measure: Clinical And Measurement Issues. *Canadian Journal of Occupational Therapy*, 61(4), 191-197.

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## **About the Authors**

### **Teoh Jou Yin**

Teoh Jou Yin is a Malaysian entrepreneur. She completed her Bachelors in Occupational Therapy with Honours degree in the National University of Malaysia. Besides her clinical practice in workplace well-being and running her own (non-OT) business, she has been actively involved in supporting occupational therapists internationally via various Kawa Model initiatives since 2010. In recognition and appreciation of her efforts, she had the honour of being appointed as Chief Symposium Covenor for the inaugural World-Japan Kawa Model Symposium in Tokyo University of Technology (Kamata campus), held in conjunction with the 2014 WFOT Congress. She uses her experiences as an entrepreneur to support fellow occupational therapists in blazing new trails, establishing practices in areas new to their context by providing guidance in non-technical skills, i.e. securing referrals, finding resources, establishing ecosystems to support their work, etc. Jou Yin believes that "evidence-base" from one context is not always "evidence-based" in another, therefore strongly advocates the need to create new and relevant "evidence" for different cultural contexts.

### **Michael K. Iwama**

Professor Iwama is an internationally known champion of culturally relevant occupational therapy. He created the Kawa Model, which has been incorporated extensively into occupational therapy settings worldwide.

Dr Iwama is Professor & Chair of Occupational Therapy at Georgia Regents University in America. Previously at the University of Toronto, Dalhousie University and the University of British Columbia (Canada), and at Kibi International University (Japan), Dr Iwama also holds honorary academic appointments at 6 universities in Canada, Australia, the United Kingdom, the Phillipines and Malaysia.

Dr Iwama has doctoral degrees in Medical Cultural Anthropology, and in Sociology, a Master's degree in Rehabilitation Sciences, and Bachelor's degrees in Occupational Therapy, and Human Performance.



10-1-2018

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# The Biopsychosocial Model: Application to Occupational Therapy Practice

## **Abstract**

Despite the call for the profession to embrace a more integrated and holistic approach to practice, therapists may be faced with practical challenges, including issues relating to client caseloads, productivity demands, scheduling, entrenched practices, limitations on service imposed by payer sources, and staffing and budgetary restraints, to name but a few. Due to these limitations, current occupational therapy practice may be predisposed to adopt a more reductive approach to the evaluation and treatment of symptoms, underlying biological pathologies, and resulting impairments and disabilities. Therefore, psychological and social factors may be neglected, resulting in an unbalanced, fragmented, and incomplete approach to patient care. This paper examines a more holistic and integrated biopsychosocial approach in current occupational therapy practice. Furthermore, an exploration of the Biopsychosocial Model, its relevance to the profession of occupational therapy, and the proposed methods of application toward a more holistic, evidence-based, and client-centered approach to clinical practice is addressed.

## **Comments**

The authors report no conflicts of interest to disclose.

## **Keywords**

biopsychosocial model, occupational therapy, psychosocial, holistic, model, frame of reference

## **Complete Author List**

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Despite the call for the occupational therapy (OT) profession to embrace a more integrated and holistic approach to practice (American Occupational Therapy Association [AOTA], 2011, 2016), therapists may be faced with practical challenges to that ideal, including issues relating to client caseloads, productivity demands, scheduling, entrenched practices, limitations on service imposed by payer sources, and staffing and budgetary restraints, to name but a few. Furthermore, while the prevailing medical model of care favors a reductive and prescriptive approach to interventions addressing pathology, dysfunction, and disability, no single, unified approach is widely taken toward a more holistic, client-centered approach that integrates social and psychological factors alongside biological. The Biopsychosocial Model (Brewer, Anderson, & Van Raalte, 2002) offers therapists a practical framework with which to bridge this divide and advance toward a more inclusive, complete, and client-focused approach to care.

This article will examine the application of the Biopsychosocial Model to OT practice and provide model-based recommendations for guiding interventions, as well as directions for future research. Given its holistic approach and its ties to evidence-based practice, this model may have direct relevance and practical applications to multiple diverse client populations and diagnostic groups across both the life span and the continuum of care.

## Literature Review

### Indications for Occupational Therapy

Beyond consideration of biological factors and their impact on function, occupational therapists should be prepared to address the psychosocial deficits that may stem from both acute and chronic conditions impacting their clients' level of engagement and function in valued roles, tasks, and activities ('occupations'). Therapists have a variety of models and theories at their disposal to operationalize these processes; however, when considering social and psychological factors in generalist practice, no single, unifying theory, model, or approach has been adopted in the profession of OT to guide screening, evaluation, or intervention. OT-specific models, such as the *Model of Human Occupation* (MOHO) or the *Person-Environment-Occupational Performance Model* (PEO), are useful in explaining some aspects and contexts relevant to evaluation and intervention and may be paired with theories relating to emotional and psychological function. However, despite training received in OT degree programs relating to the use of theory, diverse frames of reference, and holistic approaches to client care (AOTA, 2017a), a disparity exists between the occupational therapists' training and subsequent application to practice, as evidenced by the predominant use of biomechanical approaches in clinical care (Ahn, 2016; Colaianni & Provident, 2010).

### The Gap: Introduction of the Biopsychosocial Model in Occupational Therapy

OT has, since its origins in psychiatry and mental health, used engagement in meaningful occupations as a therapeutic medium to address physical, cognitive, psychological, and social barriers to function (AOTA, 2017b). With the advent of the world wars, OT practice marked a transition toward a medical model approach, as therapists began tending to the needs of returning soldiers. This shift was further solidified as de-institutionalization, and it marked a decline in facility-based mental health OT. This expansion into physical rehabilitation, concurrent with a gradual shift away from institutional mental health services, resulted in a diversification of the profession into generalists and specialists, treating clients across the life span and across the continuum of care, largely in the prevailing medical model health care system. While client populations and treatment settings may have evolved, the philosophy of the profession remains holistic (AOTA, 2011). AOTA states that "today, OT remains a

holistic profession, committed to supporting clients' health, well-being, and participation through addressing the constellation of contextual, environmental, physical, psychological, and social factors that support engagement in desired occupation" (AOTA, 2016, p. 3). Further, several AOTA official documents, including the *Scope of Practice* (AOTA, 2014) and the *Occupational Therapy Practice Framework: Domain & Process* (OTPF; AOTA, 2017c), speak to a holistic approach to client-centered care.

How is it possible that OT may need a model promoting a biopsychosocial approach to care given the profession's origins, its professional identity of incorporating a holistic and client-centered approach to care, and its national accreditation standards requiring training in biological, cognitive, psychological, and social factors? The answer to this question may be found in both the history and the demographics of the profession. First, one must bear in mind the historical and contextual shift of the profession's primary practice setting from mental health to physical rehabilitation, as well as the significant proportion of the profession's development and history that occurred under the auspices of the medical model. Current workforce statistics indicate a majority of occupational therapists employed in settings that may be considered predominantly medical model in nature, including hospitals, outpatient clinics, home health services, sub-acute rehab facilities, and long-term care (AOTA, 2015). By extension, occupational therapists have adopted models consistent with the prevailing system(s).

In reporting its findings on a survey of the profession, the National Board for Certification in Occupational Therapy (NBCOT) cited that the three most frequently used frames of reference in 2004 included (a) biomechanical, (b) neurodevelopmental, and (c) sensory integration and O'Neal, Dickerson, and Holbert (2007) reported a similar combination. Colaianni and Provident (2010) also reported a higher percentage of bottom-up biomechanical interventions (81-90%) than top-down occupation-based interventions (41-50%). More recently, Ahn (2016) reported the most frequently used intervention approach to be biomechanical, at 31.6% (compared with use of a MOHO-based approach at 5.1%). The findings from Ahn (2016), Colaianni and Provident (2010), and O'Neal et al. (2007) represent a tendency toward a reductive, bottom-up approach to intervention addressing the component parts of the underlying systems. Under this view, the individual is made up of the sum of the parts; by remediating specific faulty component parts, the whole will be restored (Brown & Chien, 2010; Fisher, 1998; Ivey & Mew, 2010). Conversely, approaches such as MOHO and the PEO, among others, represent a more adaptive, top-down approach to the delivery of care. Under these models the emphasis is on adaptation and compensation (vs. remediation) to facilitate engagement and occupational performance (Brown & Chien, 2010; Fisher, 1998; Ivey & Mew, 2010).

In sum, while the reductive, bottom-up approaches favor the remediation of underlying systems and components, the top-down approaches favor an adaptive or compensatory approach to enhancing function (Weinstock-Zlotnick & Hinojosa, 2004). Taken together, these two disparate approaches cover a broad spectrum of approaches to intervention; however, in taking diametrically opposing views, they lack a more integrated and inclusive approach. We propose that the Biopsychosocial Model, which will be introduced in the following section, provides therapists with the means to bridge this divide by moving toward a more integrated approach to client care. Consideration will be given to its central tenets, its features of critical importance to rehabilitative therapies, its ties to evidence-based practice, and a sampling of its potential applications to OT practice.

The terms biopsychosocial model and biopsychosocial approach have been widely used in the larger body of literature with varying degrees of specificity and consistency. At times, these terms have



been used in a scoping and broadly defined conceptual manner, while at other times these terms have been used to reference the unique features of a specific biopsychosocial model. Further, in the field of OT, it bears clarification that the Biopsychosocial Model being introduced in the scope of this article represents a distinct and separate approach than that proposed in Mosey's (1974) model of the same name, which espoused, in more general terms, (a) a humanistic view of the client and (b) the role of the occupational therapist in employing a teaching-learning approach in educating and engaging the client in the therapeutic process to promote participation in meaningful activity. In contrast, the adapted Biopsychosocial Model that we propose represents an adaptation of the Brewer et al. (2002) model, which identifies critical areas of impact, including biological, psychological, and social-contextual factors that bear direct relation to each other as well to therapeutic outcomes. By directly addressing these identified factors, or areas of impact, clinicians can adopt an evidenced-based approach that can enhance client outcomes (Granquist, Hamson-Utley, Kenow, & Stiller-Ostrowski, 2014). Further, in addition to critical conceptual differences, this current adapted model draws from an expanded and updated evidence base and incorporates language consistent with the OTPF (AOTA, 2017c).

### **The Biopsychosocial Model**

When considering the transition from a more singular emphasis on the bottom-up approaches of the prevailing medical model toward a more holistic and inclusive approach to evaluation and intervention, the therapist must consider not only the physical dysfunction but also psychological and social factors. Given the complex and interrelated processes that can occur between factors, as well as subsequent intermediate and long-term outcomes, it may be of benefit to the therapist to incorporate the use of an established model to inform and guide a holistic approach to intervention.

Born from the field of sports medicine, the Biopsychosocial Model (Brewer et al., 2002) represents a departure from the medical model to incorporate consideration not only of the biological factors (tissues affected, immune response, sleep, nutritional status) and nature of the injury (injury characteristics, including type, location, severity, history, and course of injury), but also the role that other factors play, including socio-demographic variables (socio-economic status, age, gender, race, and ethnicity), psychological factors (personality and emotional, behavioral, and cognitive responses), and social-contextual factors (situational and environmental characteristics, stressors, and supports and resources) (Granquist et al., 2014). This more diversified approach allows the therapist to move beyond a narrowly defined focus on biological factors, to consider and address a much broader range of factors that may exert significant impact on client outcomes. To that end, this model provides an accounting for the dynamic interactions between psychological factors and outcomes; specifically, how they reciprocally effect, and are affected by, intermediate and ultimate rehabilitation outcomes (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998). Further, this model explains the effect of personal and situational (social-contextual) factors on the cognitive appraisal (client's perceptions and beliefs) and resulting recovery outcomes in parallel with the effect of behavioral and emotional responses on cognitive appraisal and the resulting recovery outcome.

The Biopsychosocial Model (Brewer et al., 2002) includes seven factors: (a) injury characteristics, (b) sociodemographic characteristics, (c) biological factors, (d) psychological factors, (e) social-contextual factors, (f) intermediate biopsychosocial outcomes, and (g) rehabilitation outcomes. As depicted in Figure 1, injury characteristics and sociodemographic factors directly influence biological, psychological, and social-contextual factors, which in turn effect intermediate biopsychosocial outcomes, and subsequently, rehabilitation outcomes. The relationship between the

psychological factors remains central to the model, impacting biological factors and social factors, as well as the intermediate and final rehabilitation outcomes. Of special note, the Biopsychosocial Model suggests a direct line of reciprocal influence between intrinsic psychological, biological, and social-contextual factors, as well as intermediate and long-term rehabilitation outcomes.

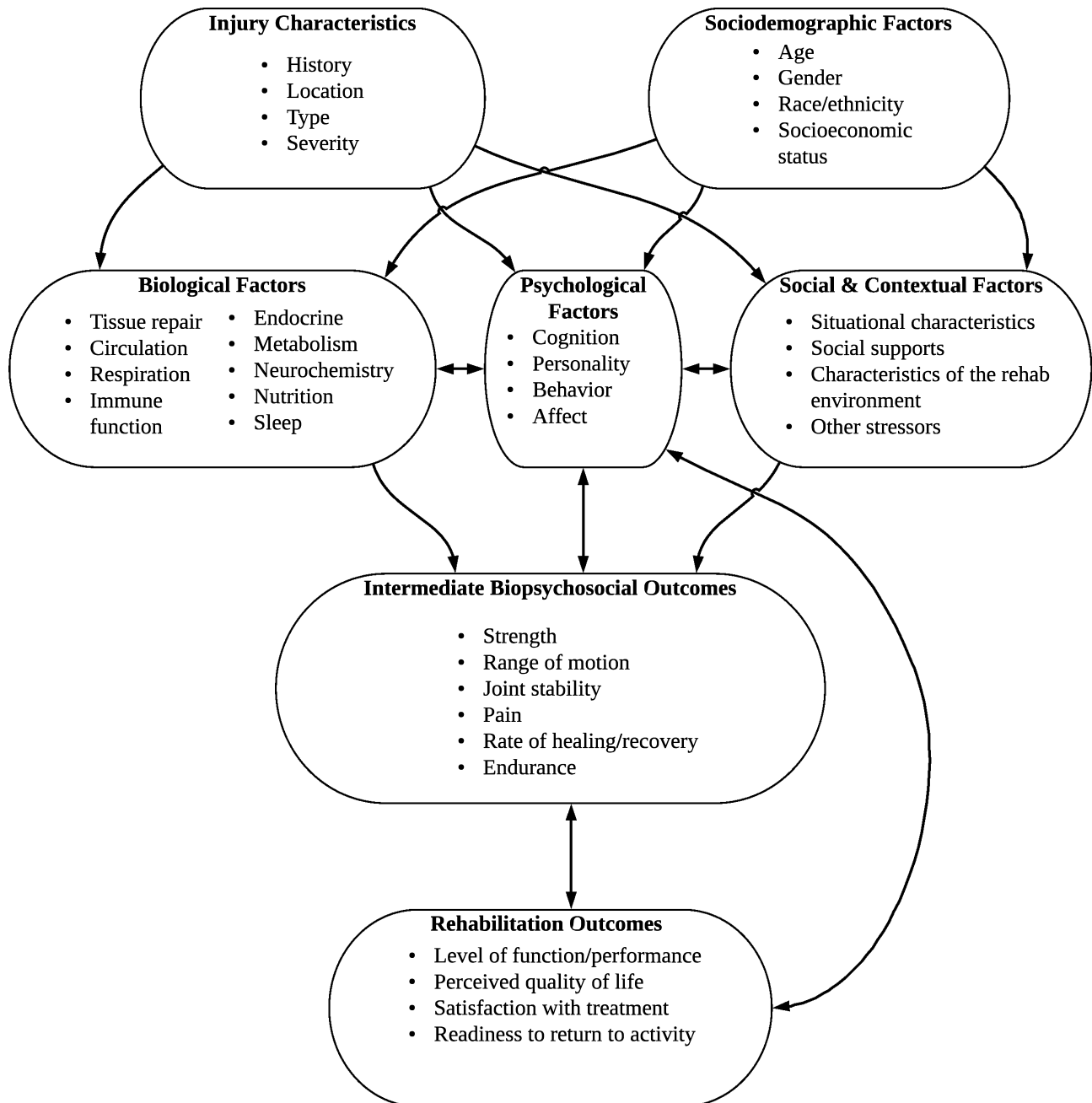


Figure 1. Adapted from “A Biopsychosocial Model of Sport Injury Rehabilitation,” by B. W. Brewer, M. B. Andersen, and J. L. Van Raalte, 2002, in D. L. Mostofsky and L. D. Zaichkowsky (Eds.), *Medical and Psychological Aspects of Sport and Exercise*, p. 48. Copyright 2002 by Fitness Information Technology.

The Biopsychosocial Model highlights multiple areas of impact in which therapists can influence recovery by intervening on factors in the model (Brewer et al., 2002). Injury characteristics and sociodemographic factors are considered stable factors that the client brings to the model; while they are important to consider in developing an effective care plan, they may not be an area of direct intervention for the therapist (Brewer et al., 2002). This combined consideration for specific areas of impact in which therapists can most effectively intervene across a diverse field of factors (biological, psychological, and sociological) (a) represents the unique hallmark of this model, (b) allows for the integration of both top-down and bottom-up approaches, and (c) keeps with a holistic and client-centered approach to care.

### **Areas of Impact**

Rehabilitation therapists can influence the recovery process by implementing interventions in areas of impact across the Biopsychosocial Model. For the client, rehabilitation outcomes are paramount for continued (or return to) participation in desired roles and activities. Biological, psychological, and sociological dimensions of the model have a direct impact on intermediate and ultimate rehabilitation outcomes. While each client brings a unique combination of injury and sociodemographic characteristics, biological predispositions, and comorbidities to the rehabilitation setting, the therapist can impact recovery by providing targeted evaluation and intervention based on the combination of dimensions. Clinical application of these areas will be explored further in the section: Introduction of an Adapted Model for Clinical Occupational Therapy Practice.

While this model was born from the domains of sports psychology and sports medicine, it bears direct relevance for application to the OT client population discussed in this article. The Biopsychosocial Model (Brewer et al., 2002) is theoretically robust in application due to sociodemographic characteristics. Further, the model includes the effect of the client's social network (or lack thereof), life stressors, and situational characteristics inclusive of home, work, and rehabilitation environments, as well as accounts for the effect of biological changes related to aging and client injury characteristics. As a result, application of an adapted Biopsychosocial Model to clients served by occupational therapists seems both plausible and promising. Further, and perhaps most relevant to current practice, this model offers therapists a tangible and accessible means by which to integrate the traditionally dichotomous approaches of top-down and bottom-up, toward a more inclusive, holistic, and client-centered approach to care.

### **Introduction of an Adapted Model for Clinical Occupational Therapy Practice**

While a stark contrast exists between the use of the Biopsychosocial Model in sports medicine and its application by occupational therapists in addressing the needs of diverse client populations, this model represents a dynamic, inclusive, integrated, and holistic approach to client care. As such, this model is both relevant and applicable to diverse populations and is in keeping with the philosophical approach of the profession of OT. We have proposed an adaptation of the Biopsychosocial Model (see Figure 2) for use in OT practice in addressing the needs of varied client populations across settings and across the continuum of care.

As illustrated, this adapted model maintains the seven key elements of the original model, including (a) characteristics of the condition (previously termed injury characteristics), (b) sociodemographic variables that impact (c) biological variables, (d) psychological variables, and (e) social-contextual variables (which reciprocally interact with each other), to impact (f) intermediate, and (g) rehabilitative outcomes (see Figure 2).

To incorporate tenets of OT, this model integrates the language of the OTPF (AOTA, 2017c), as well as considerations of environment and task variables. While this model remains person-first, the inclusion of environment and task variables was relevant and in keeping with existing approaches that consider the fit between the person, the environment, and the task in facilitating optimal function in valued tasks, roles, and routines.

### **Implications for Using the Proposed Adapted Biopsychosocial Model in Occupational Therapy Practice**

While the body of literature is too expansive to allow for an exhaustive analysis and synthesis of all clinically relevant applications of this model, the following discussion of the proposed adapted Biopsychosocial Model represents a careful sampling of relevant means by which the evidence base can be used with clients receiving OT services. The biological, psychological, and social-contextual implications are further described so that therapists may gain a greater understanding of how the model influences therapeutic assessments and interventions.

**Biological factors.** The biological dimension of the model includes physiological dispositions that may influence rehabilitation. While factors relating to characteristics of the condition and socio-demographics are relatively fixed and objective, OT interventions (rehabilitative and/or compensatory) addressing biological factors have traditionally focused on potentially modifiable variables (areas of impact). These modifiable variables include range of motion, strength, balance, coordination and motor control, modulation of sensory systems, activity tolerance, pain, and edema, as well as their subsequent impact on level of function in daily tasks, including activities of daily living (ADLs), instrumental activities of daily living (IADLs), mobility, transfers, and other valued occupations, roles, and routines. These modifiable variables are commonly the focus of treatment in many rehabilitative settings to influence indirectly the level of function in daily tasks.

In addition, education may be incorporated regarding the role of the preceding biological factors and interventions on rehabilitation, including the impact of sleep and nutrition on healing and wellness. Beyond education for informed decision-making, therapists can foster active client participation in identifying and prioritizing perceived deficits, goal areas, and preferred approaches to intervention, as well as participation in the selection of treatment modalities and activities (as appropriate) to enhance self-efficacy, perceived utility, and motivation.

While further exploration of the role of biological factors and related areas of impact could be undertaken, this section has been truncated as biological areas of impact are more commonly addressed (Ahn, 2016; Colaianni & Provident, 2010; O'Neal et al., 2007) in the provision of rehabilitative services and, therefore, may require minimal introduction. Further, while psychological and social-contextual factors exist in the OTPF (AOTA, 2014), exploring areas of impact relating to these factors may warrant greater consideration in relation to the application of this model in the following sections.

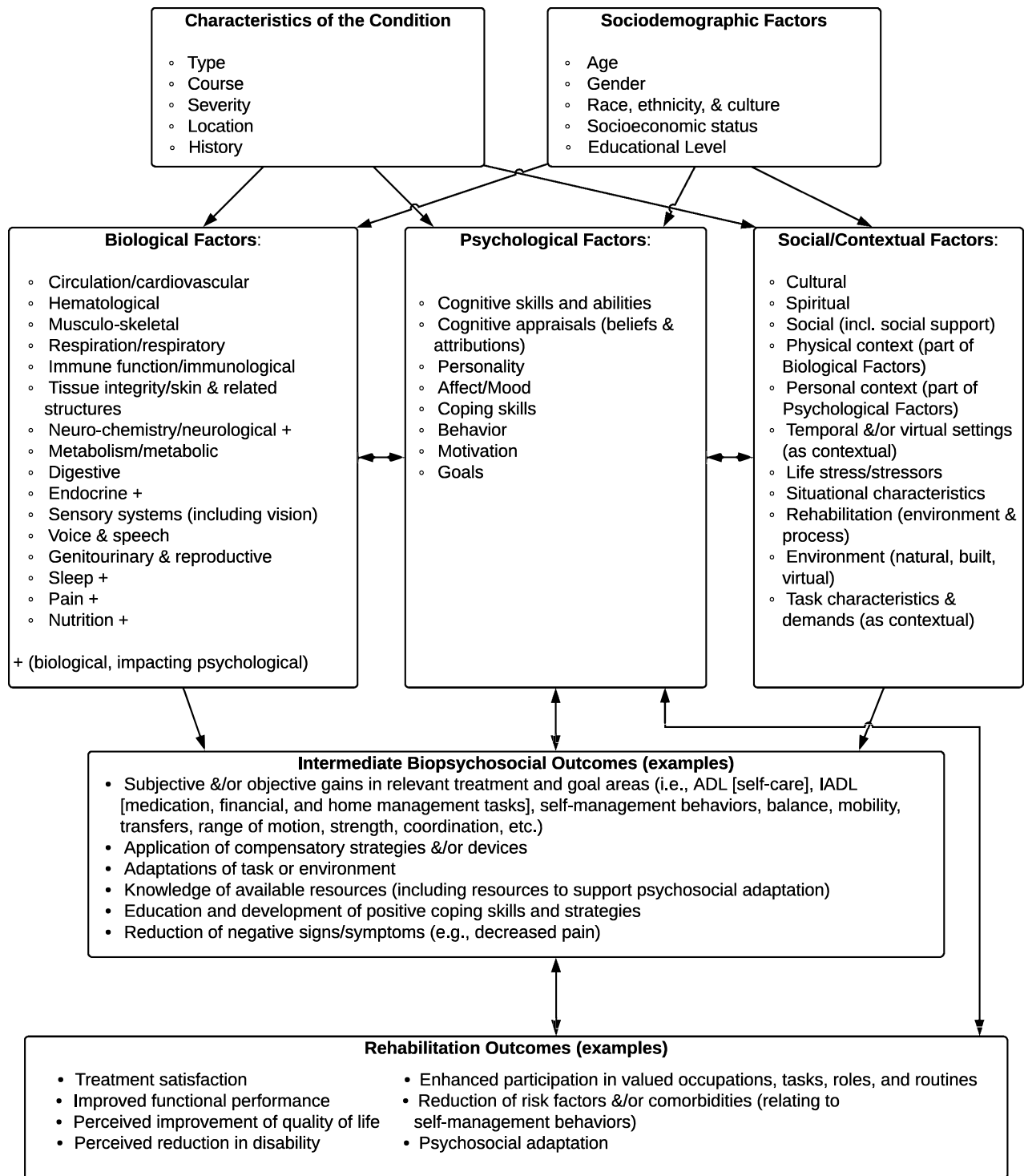


Figure 2. Adapted from “A Biopsychosocial Model of Sport Injury Rehabilitation,” by B. W. Brewer, M. B. Andersen, and J. L. Van Raalte, 2002, in D. L. Mostofsky and L. D. Zaichkowsky (Eds.), *Medical and Psychological Aspects of Sport and Exercise*, p. 48. Copyright 2002 by Fitness Information Technology. Adapted from *The Occupational Therapy Practice Framework: Domain and Process* (3<sup>rd</sup> ed.), by The American Occupational Therapy Association, 2017, *American Journal of Occupational Therapy*, 68. Copyright 2017 by The American Occupational Therapy Association.

**Psychological factors.** In conjunction with the biological areas of impact, the psychological dimension of this proposed adapted Biopsychosocial Model includes consideration of factors including the role(s) of sleep and nutrition in healing, cognitive appraisals, and psychological strategies for behavior modification. One example of a common area of impact in the category of psychological factors is how anxiety and depression influence the rehabilitation process. While the incidence of anxiety and depression in the general population has been reported to be 18.1% and 6.7%, respectively (Center for Behavioral Health Statistics and Quality, 2016), the incidence of mood disorders in the acute rehabilitation setting is reported to be much higher, ranging from 20-64% (Minniti & Tawadrous, 2015), as clients attempt to cope with changes in health, function, and independence. Further, the presence of these conditions has been correlated with diminished outcomes in diverse client populations, including older adults (Leibold, Holm, Raina, Reynolds, & Rogers, 2014; Shabab, Nicolici, Tang, Katz, & Mah, 2017); and those with stroke (Linder et al., 2015), traumatic brain injury (Bombardier et al., 2010; Browne et al., 2013), spinal cord injury (Kennedy & Rogers, 2000; Murray, Zebracki, Chlan, Moss, & Vogel, 2017), and cancer (Rost, Wilson, Buchanan, Hildebrandt, & Mutch, 2012); and clients with orthopedic (Flanigan, Everhart, & Glassman, 2015; Lenze et al., 2004), low vision (Fitzgerald & Fitzgerald, 2015), cardiac (Januzzi, Stern, Pasternak, & DeSanctis, 2000) pulmonary (Leupoldt, Taube, Lehmann, Fritzsche, & Magnussen, 2011; Luk, Gorelik, Irving, & Kahn, 2017) or inflammatory arthritic conditions (Geenen, Newman, Bossema, Vriezolk, & Boelen, 2012; Hornikx et al., 2013), among others. Given the demonstrated incidence of psychological disorders (including anxiety and depression), proactively addressing psychological factors may well be considered requisite in (a) addressing a holistic approach to evidence-based and client-centered care and (b) optimizing outcomes through addressing factors that have been demonstrated to directly impact therapeutic outcomes (Leibold et al., 2014) and quality of life (Luk et al., 2017). This further supports the connection between psychological factors and rehabilitation outcomes as illustrated by the original Biopsychosocial Model (see Figure 1) (Brewer et al., 2002), as well as the proposed adapted Biopsychosocial Model introduced in Figure 2.

While impairments of sleep and nutrition may be addressed as biological factors (Brewer et al., 2002), they have also been shown to correlate with psychological factors, including mood (depression and anxiety) and, ultimately, diminished rehabilitative outcomes (Granquist et al., 2014). Addressing these critical areas of impact may include client education regarding the role of nutrition in depression and anxiety (Rao, Asha, Ramesh, & Rao, 2008). Education may involve healthy eating, dietary restrictions and precautions, potential dietary contributions to risk factors, and recommendations for a clinical dietary consult as needed. Likewise, client education may be indicated regarding the role of sleep in managing depression and anxiety (Anxiety and Depression Association of American, n.d.). Education may include strategies revolving around restful sleep, such as using a sleep journal, modifying light and noise, using environmental strategies, following a consistent sleep schedule, and limiting use of electronic devices and the consumption of alcohol prior to bedtime (Mayo Clinic, 2017; National Institutes of Health, 2017).

Personality and personal factors also warrant consideration as components of the larger category of psychological factors in this model. Use of clinical and/or standardized measures (Granquist et al., 2014; Kamphoff, Thomae, & Hamson-Utley, 2013) for clinical profiling may help to assess areas such as motivation, focus, anxiety, worry, expectations, emotions, identity, understanding, and pain tolerance that may impact the plan of care. In addition, using a clinical profiling approach, one in which the client is actively engaged, may aide to increase the client's own self-awareness, understanding, and

motivation. This may occur through the collaborative development of a plan of care that is tailored to suit the unique interests and needs of the individual, which may further facilitate adherence to a plan of care (Granquist et al., 2014).

The occupational therapist should also consider emotional responses to injury, impairment, disability, and intervention as psychological factors. Use of clinical and standardized measures of depression and/or anxiety may help to facilitate a discussion to increase the client's awareness of potential problems and the impact of depression and/or anxiety on outcomes. In addition, the occupational therapist can raise a client's awareness through education regarding current and alternate positive coping strategies and through further discussion with the physician regarding client report and clinical presentation in therapy.

Another area of impact in the psychological domain of OT interventions includes modifying the client's behavior through rehabilitative and/or compensatory interventions. Affected cognitive skill sets (including sustained attention, alternating attention, divided attention/dual task demands, orientation, recall/memory, problem-solving, sequencing, insight and judgment, information processing, and perceptual skills) may influence the client's level of understanding and ability to participate in, carry over, and generalize treatment recommendations. Screening and provision of educational interventions may address cognitive factors relating to psychological considerations, such as past and current maladaptive coping strategies, available coping resources and supports, knowledge of stressors, and adaptive-positive coping strategies. Evidence-based cognitive coping strategies may include imagery, relaxation techniques (breathing, progressive muscle relaxation), positive self-talk, and goal-setting (Covassin, Beidler, Ostrowski, & Wallace, 2015; Granquist et al., 2014; Kersten, McCambridge, Kayes, Theadom, & McPherson, 2015).

In addition, the occupational therapist may consider the client's cognitive appraisals, which may be described as the client's beliefs regarding his or her condition, the situation, ability to impact change, or benefit from interventions. Client education (and identifying and correcting faulty or inaccurate perceptions or beliefs) may play a role in reframing these appraisals for improved motivation and outcomes. As a point of distinction, cognitive appraisals, as a component of the Biopsychosocial Model (Brewer et al., 2002; Brewer, 2007, 2009), are different from the more traditional view of cognition represented in the larger body of OT literature, which typically represents cognition as skill sets and operations, including orientation, attention, memory, perceptual skills, sequencing, and problem-solving.

The preceding section addressed psychological factors and areas of impact and represents not only areas for evaluation, but also for directed intervention. In addition, recommendations may be made for community support groups, and referrals to and collaborations with primary care and referring physicians may be made regarding client report and clinical presentation in therapy with consideration of other potentially beneficial referrals, including psychological support services. As noted with biological factors, engaging the client in identifying and prioritizing perceived deficits, goal areas, and preferred approaches to intervention as part of a collaborative approach may aide in increasing motivation and adherence to the client's OT plan of care. This may further facilitate motivation by providing education regarding diagnoses, interventions, treatment plans, and anticipated outcomes, and by establishing expectations of adherence to a plan of care (Granquist et al., 2014). Use of the Canadian Occupational Performance Measure and other similar outcome measures that incorporate client-identified goals may also be beneficial.

Behavioral techniques to facilitate goal setting, management of stress and anxiety, and positive self-talk are evidence-based interventions shown to impact therapeutic outcomes (Granquist et al., 2014). Use of these techniques, along with calibrating the client's cognitive appraisals of his or her situation, allows therapists to examine the indicated areas of impact when applying the proposed adapted Biopsychosocial Model for rehabilitative care.

**Social-contextual factors.** The social-contextual dimension of the proposed adapted Biopsychosocial Model includes consideration of factors such as social supports, life stressors, situational characteristics, and the rehabilitation environment. Occupational therapists may have a vital role to play in one of the primary areas of impact in the social-contextual factor of the Biopsychosocial Model by providing screening and educational interventions that address stress as part of a holistic and integrated plan of care. Occupational therapists should consider and discuss potential sources of stress that extend beyond the primary diagnosis and related impairments, including personal, relational, family, vocational, financial, or environmental influences.

In addressing social supports, occupational therapists may work with clients to identify potential support resources, including family, friends, physical and virtual support groups, and religious and volunteer organizations (Mohler, Neufield, & Perlmutter, 2015; Polito & Golden, 2017; Watts, Henke, Chambers, Tran, & Clarke, 2015). In addition, therapists may work to identify and educate clients about appropriate professional resources, including medical providers (primary care and specialists), rehabilitative and therapy service providers, and psychological and counseling services, among others.

Moreover, occupational therapists may explore situational characteristics that may influence the rehabilitation process. This may include working in partnership with clients to identify perceived barriers to accessing needed supports and/or participating fully in care or other situation-specific concerns that the client might have. Following identification of client concerns, a collaborative approach to problem-solving may be implemented to identify appropriate strategies to address concerns. Addressing these concerns may take the form of reframing the client's cognitive appraisals regarding social-contextual factors, education using available resources, diagnosis and plan of care, expectations for participation, and expectations for recovery (Granquist et al., 2014).

Furthermore, considering the rehabilitation environment, occupational therapists may work to reduce the psychosocial sequelae of identified deficits and facilitate adherence to the plan of care by addressing social-contextual factors. First, the therapist may work to ensure convenience in scheduling, as well as the accessibility and comfort of the treatment environment. Second, the therapist may provide education about the rehabilitative process and establish an expectation of adherence to the mutually agreed upon schedule and plan of care. Third, the therapist may work to encourage client autonomy in the treatment process by providing education for informed decision-making and collaboration regarding client identified and prioritized goals, thus allowing greater independence with selection and completion of recommended treatment tasks as able. Finally, the therapist may structure sessions to include additional supports, including the support of other clients or other staff members, and family by incorporating family training to provide education regarding diagnosis, the role of therapy, plan of care, progress, and recommendations for beneficial supports (Granquist et al., 2014).

Additional elements, including characteristics of the environment and task, have been added to this revised model and serve as contextual features and elements that may have reciprocal effects on biological and psychological factors. However, these additional environmental and task-related factors



are not further explored here, as they are widely represented in the larger body of OT literature with regard to consideration of facilitating fit between person-environment-task variables.

### **Case Vignette: Application of Revised Model to Practice**

To facilitate a clearer and more detailed understanding of how OT can provide therapeutic services to address areas of impact in the biological, psychological, and social-contextual factors, a vignette overviewing selected areas of impact for a client who experienced a cerebral vascular accident (CVA) has been presented as a sequential series of five images. Appendix A includes the vignette along with the first tier of the model, including characteristics of the condition and sociodemographic factors. The next tier of the model explores inter-related elements of the biological (see Appendix B), psychological (see Appendix C), and social-contextual factors (see Appendix D). Lastly, the resulting intermediate biopsychosocial outcomes and subsequent rehabilitative outcomes are considered in the final tiers of the proposed adapted model (see Appendix E).

### **Discussion**

The proposed adapted Biopsychosocial Model provides a framework for a holistic approach to client care that will enable the occupational therapist to consider and address psychological and social-contextual factors in addition to the nature of the condition, client demographics, and biological factors. This more integrated approach offers the occupational therapist the opportunity to move beyond singular reliance on remedial bottom-up or adaptive and compensatory top-down approaches toward a more inclusive and individualized approach to evidence-based, client-centered care in addressing a broader range of factors impacting therapeutic outcomes. In addition, given the inclusive nature of this model, the potential exists for the integration of other appropriate interventions, approaches, models, and theories in the biopsychosocial framework to address the needs of the individual client.

### **Future Research**

This skilled clinical integration of multiple approaches toward an individualized and hybridized model of evidence-based and client-centered care represents both the art and the science of OT in client care. Further research is needed to advance evidence-based practice through (a) continued model development and revision, (b) theory design and validation, (c) design and testing of evaluation and screening measures to address core biological factors alongside psychological and social factors, and (d) efficacy studies of available approaches to intervention. In addition, and more specifically relevant to the ongoing development of this model, further study may be warranted to explore the nature of relationships between biological and social-contextual factors and rehabilitation outcomes. Under the current model, biological, psychological, and social-contextual factors each influence intermediate outcomes, as well as each other. While the Biopsychosocial Model (Brewer et al., 2002; Brewer 2007, 2009) proposes that biological and social-contextual factors affect rehabilitation outcomes by way of intermediate outcomes, it may be relevant to determine whether these factors exert direct and independent influence on rehabilitation outcomes. Further, exploration regarding the nature and direction of the relationships may be of benefit in the development of a more dynamic and integrated model.

### **Conclusion**

Beyond consideration of fit between factors relating to person-environment-task and occupation, the proposed adapted Biopsychosocial Model offers an integrated, holistic, and evidence-based approach to addressing the person at the center of the model. Inclusive of both top-down and bottom-up approaches, this person-first approach is not achieved through the exclusion of factors, but rather

through the inclusion of multiple related factors as important contextual variables that may have a reciprocal impact on the individual and, ultimately, on rehabilitation outcomes. In sum, awareness, identification, and inclusion of biopsychosocial factors in the plan of care may provide therapists with a broader base from which to effect real and meaningful improvements in clients' outcomes, including level of function, satisfaction, and quality of life.

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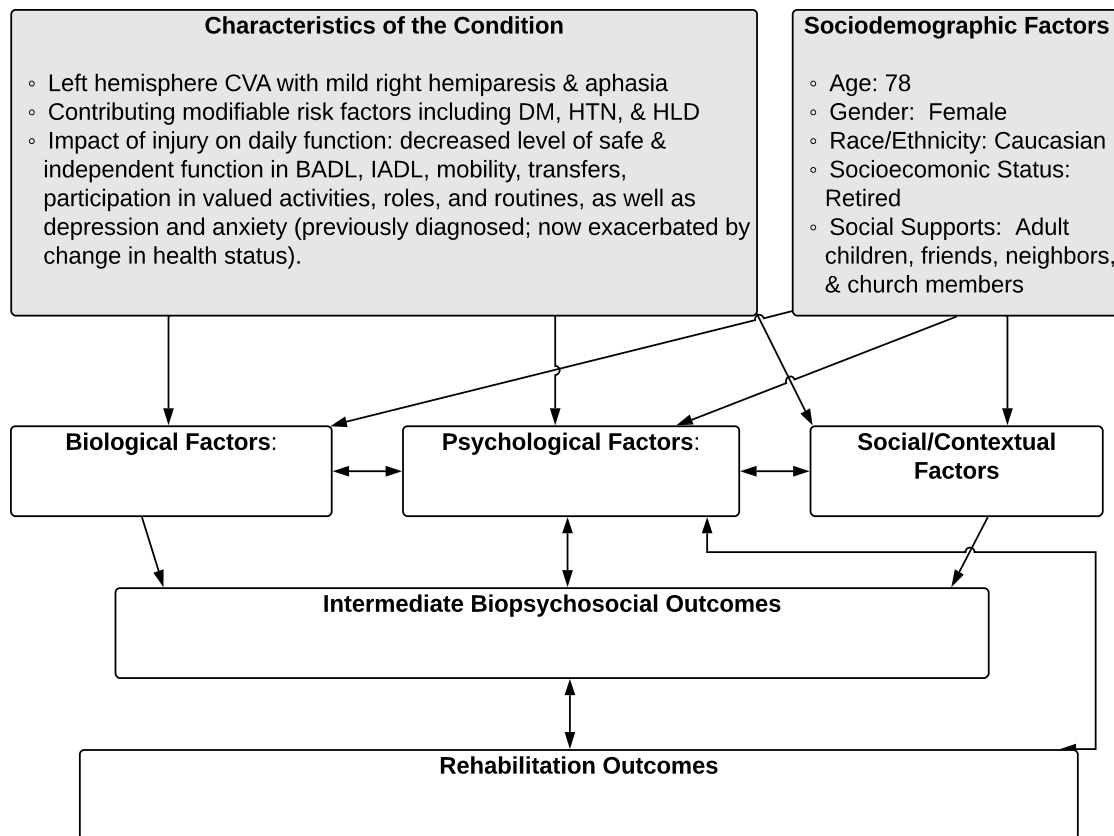
## Appendix A

### Vignette, Characteristics of the Condition, and Sociodemographic Factors

#### Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith Vignette, Characteristics of the Condition and Sociodemographic Factors

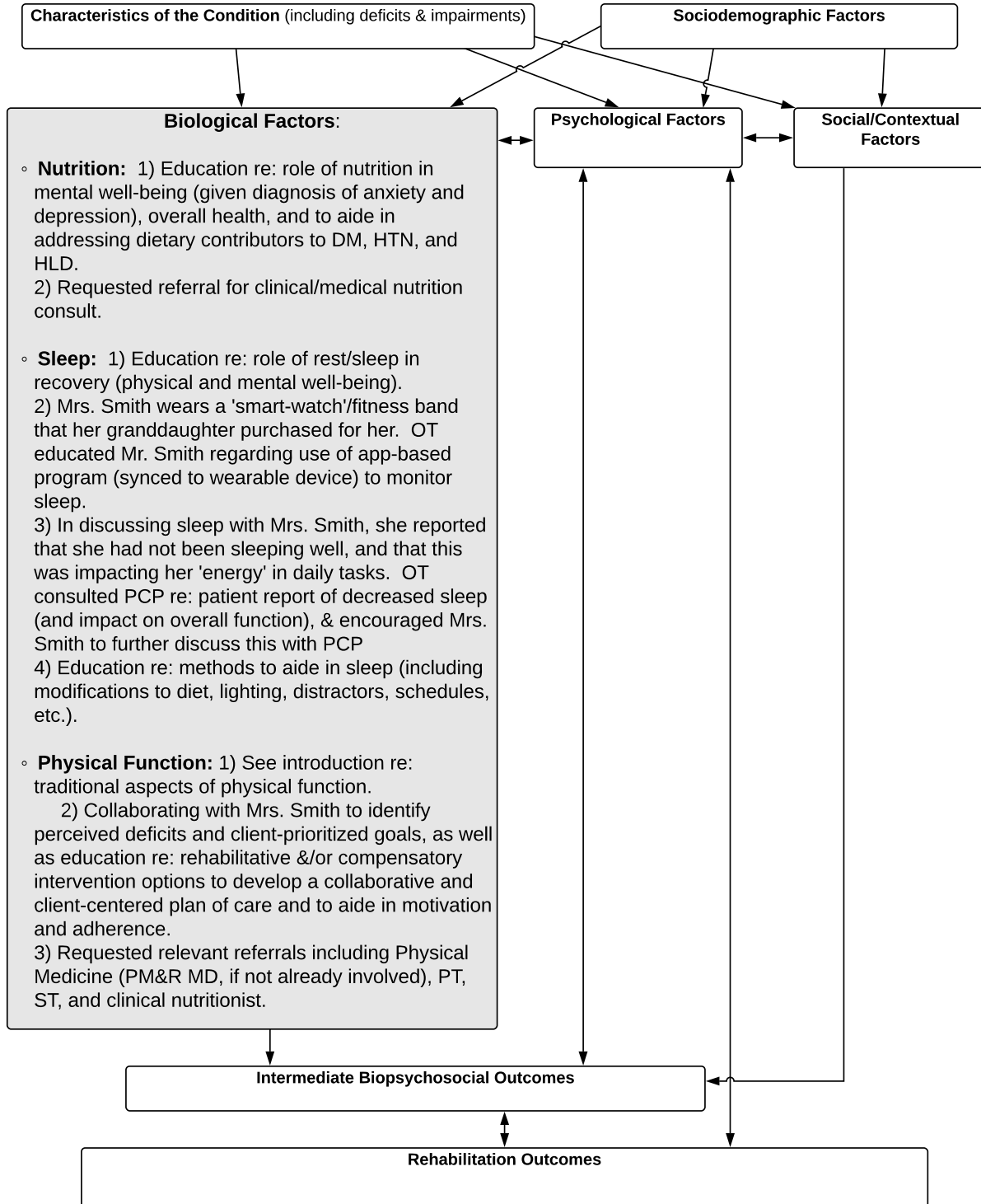
Mary Smith, a 78-year-old widowed retiree, is being evaluated for occupational therapy services following a recent left hemisphere stroke that has resulted in mild aphasia and right hemiparesis; both of which are now resolving. Mrs. Smith has comorbidities including type-2 diabetes (DM-II), hypertension (HTN), hyperlipidemia (HLD), and history of depression and anxiety. Overall, Mrs. Smith currently requires minimal assistance for transfers, mobility, and self-care due to her right hemiparesis. Mrs. Smith was fully independent in all areas prior to her stroke, and she was actively involved in her church, gardening, and home-making activities. Mrs. Smith has become tearful and has expressed concern regarding her ability to care for herself and her ability to return to the activities and roles that she values.

*In addition to traditional interventions* addressing 1) physical function (as part of 'biological factors') including neuromuscular reeducation of the left hemi-body, balance, transfer and mobility training, and ADL and IADL training, 2) cognitive factors (as part of 'psychological factors') including attention, recall, sequencing, problem-solving, etc., consider how the intervention in the following sections may address modifiable elements of biological, psychological, and social/contextual factors as part of a more holistic and evidence-based approach to client-centered care.



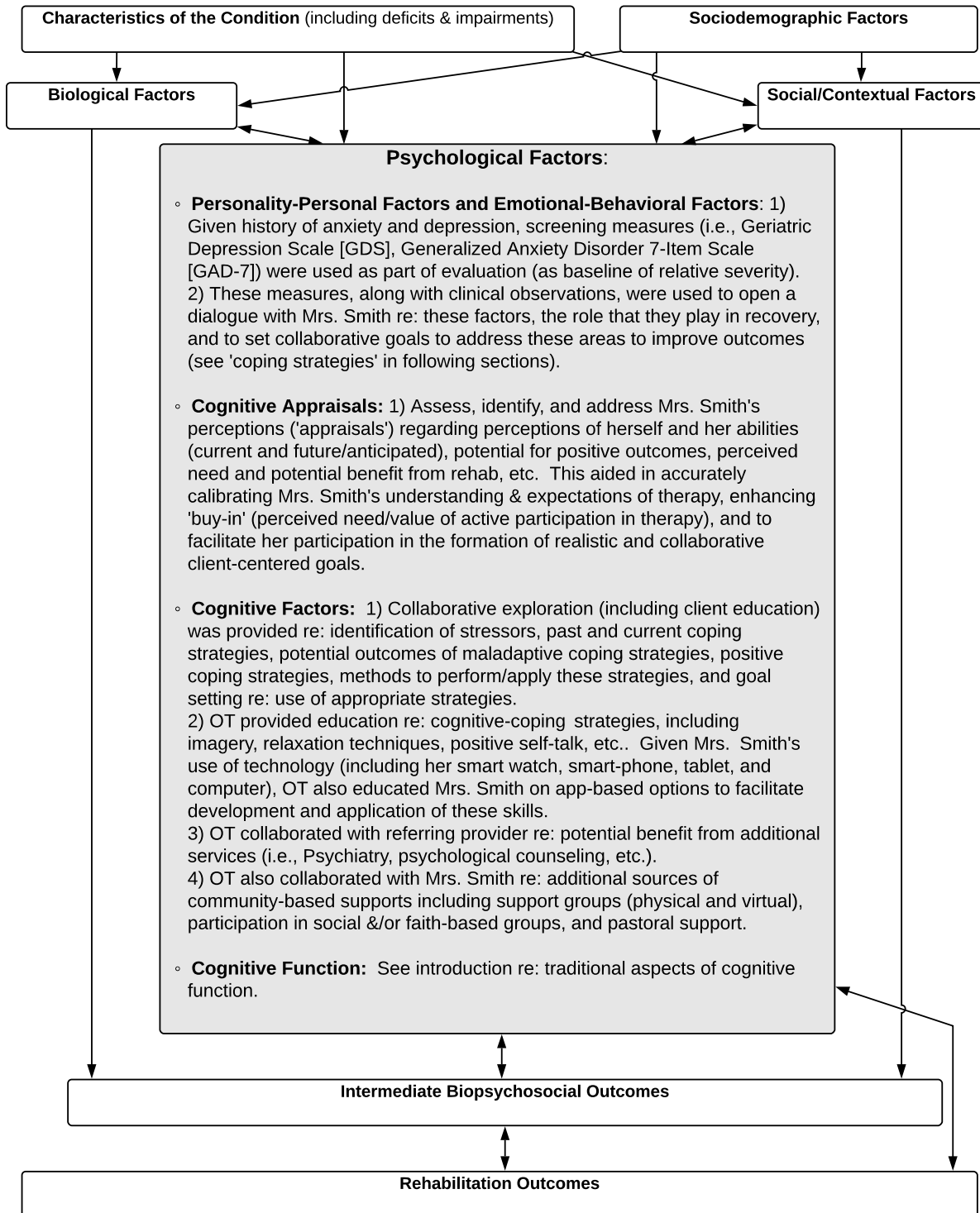
## Appendix B Biological Factors

### Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith Biological Factors: A Sampling of Possible Interventions to Address Areas of Impact



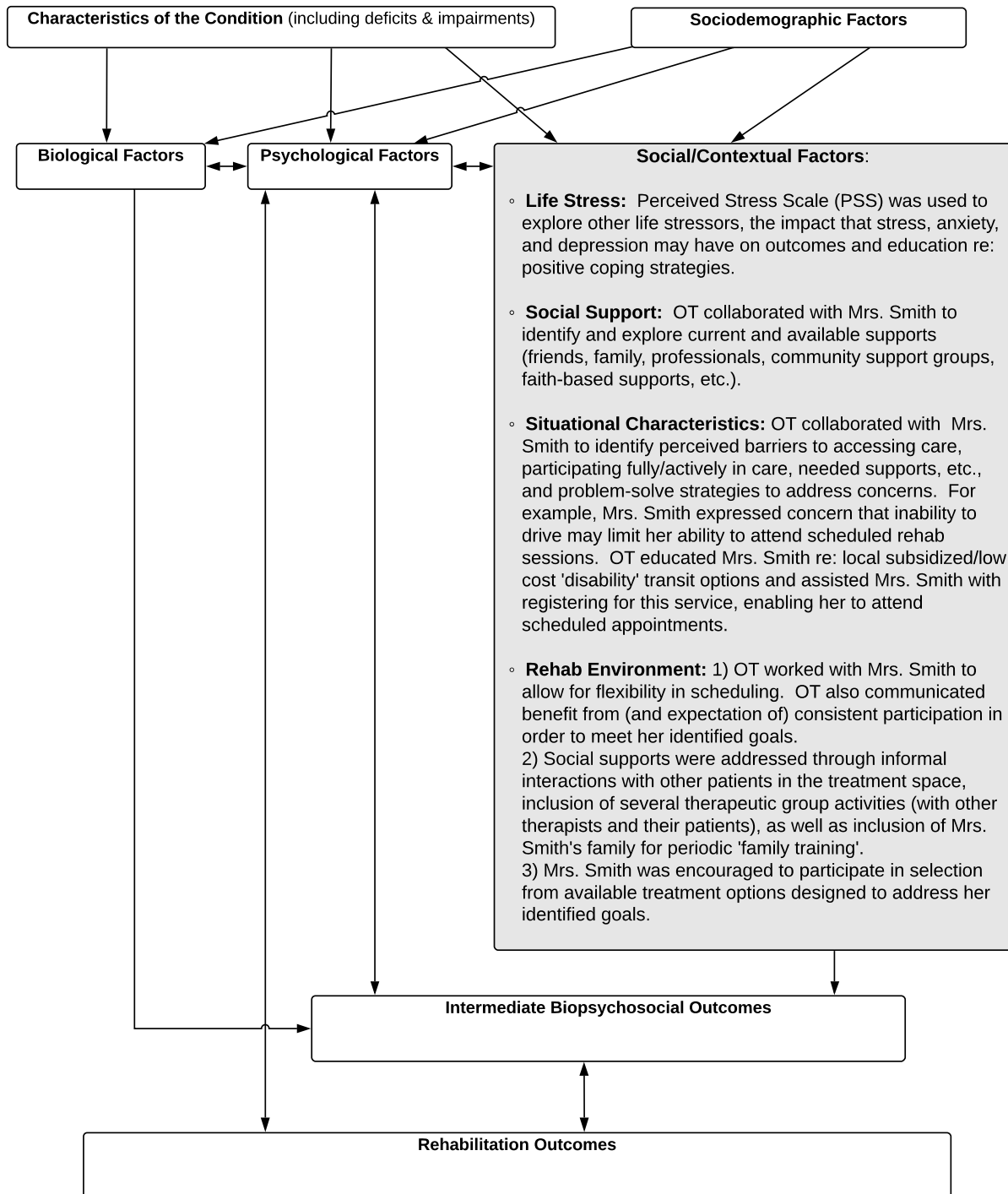
## Appendix C Psychological Factors

### Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith Psychological Factors: A Sampling of Possible Interventions to Address Areas of Impact



## Appendix D Social-Contextual Factors

**Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith**  
**Social & Contextual Factors: A Sampling of Possible Interventions to Address Areas of Impact**





## Appendix E

### Immediate Biopsychosocial and Rehabilitation Outcomes

**Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith Outcomes**

